## **51397/LTR/B600** - BP-1277-CON.2

## ABSTRACT OF THE DISCLOSURE

Improved carrier recovery, symbol timing, and carrier phase tracking systems and methods suitable for connection with a dual-mode OAM/VSB receiver system are disclosed. Carrier and phase recovery systems operate complex signals representing symbols having the same time stamp for each phase error term. in-phase signals are sampled twice a symbol at the in-phase symbol sampling time and at the quadrature-phase symbol sampling time. The signals are demultiplexed to generate I and X<sub>1</sub> data streams. where I represents the in-phase sampling time signals and  $X_T$  represents mid-symbol point sample times. A similar procedure is carrier out on quadrature-phase signals. When the in-phase signal is de-multiplexed to generate a symbol I, the quadrature-phase signal is de-multiplexed to generate its mid-symbol point  $X_0$ . Both I and Q are decoded in a decision device to define a symbol error term, which is combined with the opposite midsymbol signal to define a phase error term  $P_{\rm I}$  and  $P_{\rm O}$  for each In both cases, the symbol (I) decision (Î), and midsymbol  $(X_0)$  in each phase error term  $(P_I)$  computation will have the same prime index.

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